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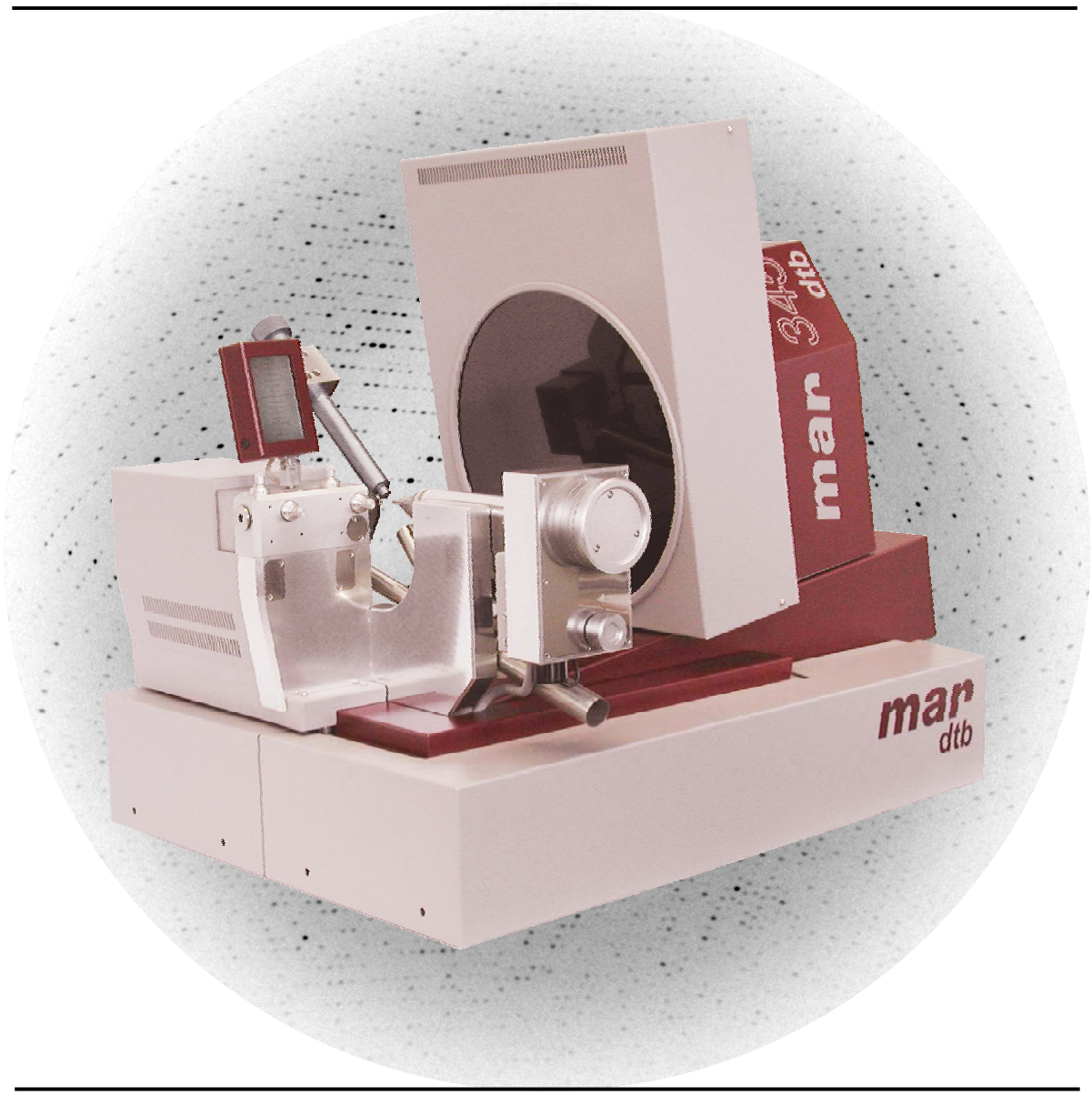
The mar345dtb Software Distribution Guide

By Dr. Claudio Klein



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Contents

1. Distribution Media

Media	OS	Suggested directory	Mount CD-Rom with
	IRIX >= 6.5	/usr/people/mar345	mount -t iso9660 -r /dev/rdsk/dksXdYvol /CDROM
CD-Rom	Tru Unix >= 5.0	/usr/users/mar345	mount -t cdfs -r -o rrip /dev/rzYc /mnt
	Linux kernel >= 2.4.0	/home/mar345	mount -t is09660 -r /dev/cdrom /mnt/cdrom

X denotes the SCSI-controller (e.g. 0) and Y the SCSI-id (e.g. 4).
Most executable programs are also available as gzip compressed files via anonymous FTP from ftp.EMBL-Hamburg.de, directory pub/marx/dtb/....
Due to their size (180 MB), scanner calibration files are not available per FTP. Please contact X-ray Research for assistance.

2. Compilation Notes

OS	Compilers used	Motif version used
IRIX	C-7.2.1	Motif 1.2.4 X11R6
Compaq Tru Unix	C-5.2	Motif 1.2.4 X11R5
Linux	GCC-2.95	Motif 2.1.30 X11R6

3. Environment

The following logical assigments must be set to run certain programs:

Variable name	Description	Used by programs
MARHOME	Master directory of distribution	all
MARLOGDIR	Directory for log files	all
MARTABLEDIR	Directory with scanner specific tables	*mar345dtb, mar345, scan345, mar345xf*
MAR_SCANNER_NO	*mar345* scanner serial number	*mar345dtb, mar345, scan345, mar345xf*
MAR_DTB_NO	*dtb* serial number	*mar345dtb*
MARDOCDIR	Directory with documentation	*mar345dtb*
MARMANDIR	Directory with man pages	*mar345, marFLM/HKL/XDS, automar*
MARHELPDIR	Directory with online help files	mar345, marView, marTools

4. Directory Structure

The *mar345dtb* software distribution directory ($MARHOME) contains the following subdirectories:

Directory	Contents
bin/linux	Binary executables for Linux
bin/sgi	Binary executables for SGI IRIX
bin/osf	Binary executables for Compaq Tru Unix
man/1	Unformatted man pages for selected programs
man/cat1	Formatted man pages (SGI)
man/man1	Compressed unformatted man pages (Linux & Compaq Tru Unix)
man/ps	Postscript files of formatted man pages, ready for printing
man/doc	ASCII text of formatted man pages, ready for online read (more)
man/html	HTML-formatted text of man pages
man/pdf	PDF-formatted documentation
man/help	Online help files for some GUI's (*mar345, marView, marTools*)
log	Log-files for programs *mar345dtb*, *mar345* and scan345
log/log	Up to N versions of mar.log or dtb.log
log/lp	Up to N versions of mar.lp files (statistical output)
log/spy	Up to N versions of mar.spy and dtb.spy files (native controller messages)
log/beam	Up to N versions of dtb.time, dtb.scan and dtb.profile
log/sets	Data collection template files for *mar345dtb*
log/tv	Up to N versions of martv.log
src	Source code for selected programs
tables	Scanner specificic calibration and configuration files
Optional:	
marflm	Latest *marFLM* distribution
marhkl	Latest *marHKL* distribution
marxds	Latest *marXDS* distribution
automar	Latest *automar* distribution

5. **Description of Programs**

Name	Docu.	Priority	Description
Graphical User Interfaces:			
mar345dtb	yes	A	GUI for data collection with *mar345*-scanner and *dtb*
mar345	yes	C	GUI for data collection with *mar345*-scanner without *dtb*
marstart	-	A	Works together with program *mar345dtb* and *mar345*
martv	yes	A	Shows crystal on screen as seen by TV-camera in *dtb*
marView	yes	A	Standalone GUI for data display and inspection
marTools	yes	B	GUI for image manipulation and format conversion (not updated)
tkmarcvt	-	B	Tcl/TK based GUI for program *marcvt*
automar	yes	C	GUI for *automar* processing package (*marProcess, marScale*)
marHKL	yes	C	GUI for HKL processing package (*denzo, scalepack*)
marFLM	yes	C	GUI for MOSFLM processing package (*ipmosflm, scala*)
marXDS	yes	C	GUI for XDS processing package (*xds, xscale*)
Hardware related programs:			
mar345xf	yes	C	Standalone transformation program for spiral images
marsim	yes	D	Scanner simulator for programs *mar345(dtb)* and *scan345* for performance tests and/or debugging
scan345	yes	D	Non-GUI data collection program for *mar345*–scanner (not *dtb)*
modnb	-	D	Modifies header of calibration files
swapnb	-	D	Swaps bytes in calibration file. Useful when replacing the data collection computer by one with a different byte-order.
dtbcmd	-	B	Sends a native hardware command to the *dtb* controller
dtbstat	-	B	Dumps status information of the *dtb* controller
dtbdata	-	B	Dumps ionization chamber readings from motor scans of *dtb*
dtbmess	-	B	Dumps native *dtb* controller messages
Format conversion programs:			
marcvt	yes	A	Non-GUI image format and manipulation tools (updated)
marcombine	yes	B	Adds up images and produces o/p-file with combined intensities
spiral(un)pack	yes	C	(De-)compression of raw spiral images
Other programs:			
catmar	yes	A	Dumps headers of mar345/300 images and calibration files
marstats	yes	C	Dumps average intensity and sigmas of images
Data processing related programs for use within *automar, marHKL/FLM/XDS*:			
marPeaks	yes	C	Spot search
marIndex	yes	C	Autoindexing
marPredict	yes	C	Pattern prediction
marStrategy	yes	C	Calculates optimal data collection strategy

Priority codes:

A	Essential
B	Helpful, installation recommended
C	Not essential, may be removed
D	Needed only in special situations.

6. Documentation

The documentation can be found in directory $MARHOME/man. Several formats are available:

Directory	Description
man/1	Unformatted man pages for selected programs
man/cat1	Formatted man pages (SGI)
man/man1	Compressed unformatted man pages (Linux & Compaq Tru Unix)
man/ps	Postscript files of formatted man pages, ready for printing
man/doc	ASCII text of formatted man pages, ready for online read (more)
man/html	HTML-formatted text of man pages
man/pdf	PDF-formatted documentation
man/help	Online help files for some GUI's (*mar345,marView, marTools*).
man/mar345dtb	HTML documentation of program *mar345dtb*

The following man pages are available:

Program name	Description
mar345dtb	Documentation for program *mar345dtb*
mar345	Documentation for program *mar345*
martv	Documentation for program *martv*
marView	Documentation for program *marView*
marTools	Documentation for program *marTools*
tkmarcvt	Documentation for program *tkmarcvt*
mar345xf	Documentation for program *mar345xf*
scan345	Documentation for program *scan345*
marsim	Documentation for program *marsim*
marcvt	Documentation for program *marcvt*
marcombine	Documentation for program *marcombine*
spiralpack	Documentation for program *spiralpack*
catmar	Documentation for program *catmar*
marPeaks	Documentation for program *marPeaks*
marIndex	Documentation for program *marIndex*
marPredict	Documentation for program *marPredict*
marStrategy	Documentation for program *marStrategy*
mar345_formats	Documentation for program *mar345* image formats
mar300_formats	Documentation for program *mar300* image formats
mar345_config_file	Documentation for the configuration file for program *mar345* (not *mar345dtb*)

To view the man pages using man, the directory $MARHOME/man must be in the man page search path. Consult the "man" man page for further details, since this varies from computer to computer. The GUI's provide "Help"-buttons for additional online information.

When run with the "-h" command line option, usage information is provided for most of the mar programs, e.g. type:

marcvt -h

7. Software Installation

7.1 Create User Account “mar345”

You must be super-user to do this. You can either use a GUI (e.g. *kuser* from the KDE package, *yast1* or *yast2* from the SuSE Linux distribution, *System Manager* on SGI, *dxaccounts* on Compaq Tru Unix) or a terminal program like *useradd* or *adduser*.

Suggested home directory: **/home/mar345**
Default login shell: **/bin/tcsh** (highly recommended, since no shell initialization file is provided for Bourne shells)

7.2 Login as User “mar345”

7.3 Copy CD-ROM

Insert the CD-ROM in the CD-ROM reader. If there is an automounter, the CD-Rom is going to be mounted automatically (on RedHat usually as /mnt/cdrom, on SGI usually as /CDROM). Otherwise, on many systems, users are allowed to mount CD-Roms by just typing:

mount /PATH

where **/PATH** can be **/mnt, /mnt/cdrom, /cdrom** or **/CDROM**.
If this doesn't work, the super-user has to do something like:

mount -t iso9660	**-r**	**/dev/cdrom**	**/PATH**	**(Linux)**
mount -t iso9660	**-r**	**/dev/rdsk/dks0d4vol**	**/PATH**	**(SGI)**
mount -t cdfs -o rrip –r		**/dev/rz0c**	**/PATH**	**(Tru Unix)**

When successful, the contents of the CD-ROM should be copied into the login directory of the account mar345.To do so, as user "mar345" type:

/PATH/mar_install

The installation script chooses reasonable defaults that may be accepted or modified. It is important that the contents of the CD-Rom are really copied to the login directory of the new user since the distribution contains customized startup files (.cshrc, etc.) which should reside in the login directory.

8. Setting Up the Ethernet Connection

Program *mar345dtb* communicates with the *dtb* and the *mar345*-scanner through an Ethernet interface. To use program *mar345dtb*, the network must be configured to meet the requirements of the controllers. The *mar345*-scanner has the fixed IP-address 192.0.2.1 and the *dtb* is set to address 192.0.2.3. The host computer Ethernet interface must be set to address 192.0.2.2. Network 192.0.2.x belongs to a pool of addresses that is not assigned to official networks so there should not be any conflict with the outside world.

8.1 Configure a Dedicated Ethernet Card With IP-address 192.0.2.2

To configure an Ethernet card it is most convenient to use the graphical administration tools. On SuSE Linux, most system configuration parameters will be taken from file /etc/rc.config which may be edited by hand, but you really need to know what you are doing. It is safer to use either *yast1* or *yast2* to do the configuration. On RedHat Linux, the graphical network administration tool is *netcfg*. On SGI, choose the Networking Setup part of the *System Manager* and on Compaq Tru Unix use the GUI called *netconfig*.
When using 2 Ethernet cards, the primary Ethernet card (eth0 on Linux, ec0 on SGI, tu0 on Compaq Tru Unix) is normally configured as member of your local network and the second Ethernet card (eth1, ec1, or tu1) should be used to work with the *mar345* and *dtb*.

In any case, the following parameters need to be assigned to the network card connecting to the *mar345*–detector and *dtb*:

IP-address: **192.0.2.2**
Netmask: **255.255.255.0**

8.2 Add Entries to /etc/hosts

Edit file **/etc/hosts** and add the following lines to the end of the file:

192.0.2.1 mar345
192.0.2.3 dtb

If you can't find an entry for IP-address 192.0.2.2, also add:

192.0.2.2 eth1

8.3 Confirm Settings

Configuring the network card normally requires a reboot of the computer. Afterwards, you should be able to access other hosts (e.g. mar345) on network 192.0.2. To check network card eth1 (on SGI: ec1, on Tru Unix: tu1), type:

ifconfig eth1

On Linux, this command should come back with something like:

```
eth1      Link encap:10Mbps Ethernet  HWaddr 00:80:C6:FF:EF:08
          inet addr:192.0.2.2  Bcast:192.0.2.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0
          TX packets:0 errors:0 dropped:0 overruns:0
          Interrupt:12 Base address:0x320
```

The correct routing table can be checked using command:

netstat –r

On Linux, it should say something similar to:

Kernel IP routing table

Destination	Gateway	Genmask	Flags	MSS	Window	irtt	Iface
193.141.161.0	*	255.255.255.0	U	1500	0	0	eth0
192.0.2.0	*	255.255.255.0	U	1500	0	0	eth1
127.0.0.0	*	255.0.0.0	U	3584	0		

Connect the *mar345*-scanner and/or *dtb* to the Ethernet card and power them up. To check availability on the network, type:

ping 192.0.2.1 (check availability of mar345 detector)

or

ping 192.0.2.3 (check availability of dtb)

If the scanner is accessible, ping comes back with:

PING mar345 (192.0.2.1): 56 data bytes
64 bytes from 192.0.2.1: icmp_seq=0 ttl=255 time=1 ms
...

If ping comes back with:

ping: mar345: Unknown host

or

ping: dtb: Unknown host

then, mar345 and/or dtb has not been inserted into file /etc/hosts (see above).
If ping hangs with:

PING mar345 (192.0.2.1): 56 data bytes

or

PING dtb (192.0.2.3): 56 data bytes

then the reason might be:

a) the network interface has not been configured correctly
b) the scanner or *dtb* are not turned or are not yet ready to listen
c) there is a problem with the Ethernet cable
d) there is a problem with the hub (check power cable!)
e) a regular RJ-45 cable has been plugged into the **Uplink** port of the hub
f) a cross-over cable has been plugged into any but the **Uplink** port of the hub
g) there is a problem with the scanner or *dtb* itself

8.4 How to Connect RJ-45 Cables to a Hub

A hub allows two or more computers to talk to eachother. There are two types of twisted pair Ethernet cables with RJ-45 connectors: regular ones and cross-over cables. Crossed cables must be used to directly connect two computers to eachother without a hub inbetween. I.e. you can use a crossed cable to connect the Ethernet card of your computer and the *mar345*-detector with no hub inbetween. If there is hub, please note, that most hubs feature 4 or more regular ports and one “Uplink” port. You can connect regular cables to the regular hub ports (i.e. *mar345*-detector, *dtb* and computer). Alternatively, you may use a crossed cable to connect the computer or *mar345* or *dtb* to the “Uplink” port of the hub. All other combinations are not going to work.